

CHAPTER IV

RESULTS

1. Mandibular foramen measurements

The average distances from the mandibular foramen to surrounding bony landmarks on the mandible were presented in Table 1. The results obtained in this study showed the average distance from the mandibular foramen to the condyloid process was 41.37 ± 3.82 mm. The average distance to the coronoid process was 38.78 ± 4.09 mm. The average distance to the internal oblique ridge was 12.71 ± 2.10 mm. The average distance to the pre-angular notch was 27.75 ± 3.87 mm. The average distance to posterior border of the mandibular ramus was 14.49 ± 1.99 mm. There were differences between sides in which parameters ($P < 0.05$).

In contrast, no significant difference was seen for the average distance from the mandibular foramen to the mandibular notch was 22.72 ± 3.25 mm. The average distance to the third molar was 18.65 ± 3.49 mm. The average distance to the symphysis menti was 69.62 ± 3.84 mm. The average distance to the inferior border of the ramus was 26.12 ± 3.89 mm. The average distance to angle of the mandible was 24.66 ± 4.27 mm. The average distance to anterior border of the mandibular ramus was 19.75 ± 2.63 mm. The average of mandibular width was 7.59 ± 2.25 mm. There was no accessory mandibular foramen detected in this study.

Table 1. Mandibular foramen measurements

The Distance (n=180)	Range (mm)	Right Mean \pm SD (mm)	Left Mean \pm SD (mm)	Total Mean \pm SD (mm)
1. MDF – Condylod process	28.59 - 54.65	41.08 \pm 3.89	41.66 \pm 3.75 ^a	41.37 \pm 3.82
2. MDF – Mandibular notch	13.45 - 34.07	22.84 \pm 0.24	22.60 \pm 3.29	22.72 \pm 3.25
3. MDF – Coronoid process	24.73 - 50.76	38.49 \pm 4.18	39.06 \pm 3.99 ^a	38.78 \pm 4.09
4. MDF – Internal oblique ridge	6.00 - 25.26	12.27 \pm 1.88	13.16 \pm 2.21 ^a	12.71 \pm 2.10
5. MDF – Third molar	9.49 - 30.89	18.76 \pm 3.43	18.54 \pm 3.54	18.65 \pm 3.49
6. MDF – Symphysis menti	58.43 - 79.77	69.73 \pm 3.84	69.50 \pm 3.85	69.62 \pm 3.84
7. MDF – Pre-angular notch	19.15 - 39.48	27.53 \pm 3.86	27.98 \pm 3.87 ^a	27.75 \pm 3.87
8. MDF – Inferior border of the ramus	17.06 - 40.42	26.08 \pm 3.84	26.15 \pm 3.95	26.12 \pm 3.89
9. MDF – Angle of the mandible	16.10 - 41.69	24.66 \pm 4.18	24.65 \pm 4.36	24.66 \pm 4.27
10. MDF – Anterior border of mandibular ramus	10.89 - 30.61	19.67 \pm 2.71	19.84 \pm 2.55	19.75 \pm 2.63
11. MDF – Posterior border of mandibular ramus	9.55 - 21.23	14.72 \pm 2.00	14.26 \pm 1.94 ^a	14.49 \pm 1.99
12. Mandibular foramen width	4.83 - 44.97	7.75 \pm 2.97	7.44 \pm 1.16	7.59 \pm 2.25

a $p < 0.05$ vs. right side

(In detail, see Appendix B)

MDF = Mandibular foramen

2. Mental foramen measurements

Regarding measurements of the mental foramen, the significant differences in side were found in some parameters. These included the average distance from mental foramen to inferior rim of the mandible was 13.53 ± 1.56 mm. The average distance to the midpoint on the mandible symphysis was 27.43 ± 2.11 mm. The average distance to posterior border of the ramus was 71.11 ± 4.12 mm. The average distance to condyloid process was 95.08 ± 4.86 mm.

Concerning the average distance from the alveolar crest to inferior rim of the mandible was 29.31 ± 6.60 mm. The width of the mental foramen (horizontally) was 3.70 ± 0.91 mm. The width of the mental foramen (vertically) was 2.96 ± 0.57 mm, which were not significantly different between sides (Table 2).

The accessory mental foramen was found in 7 cases, 3.8% (3 cases on the right side and 4 cases on the left side). These additional foramens were present posteroinferiorly (5 cases), superiorly (1 case), anterosuperiorly (1 case). The results of all measurement were shown in Table 3.

The majority of mental foramen was located below the second premolar (70%). The second most common were located between the second premolar and first molar (24.16%). The third most common were located between the first and second premolars (3.33%). The last most common was located below the medial root of the first molar (2.5%) (Table 4-5).

Table 2. Mental foramen measurements

The Distance (n=180)	Range (mm)	Right Mean \pm SD (mm)	Left Mean \pm SD (mm)	Total Mean \pm SD (mm)
1. MTF – Inferior rim of the mandible	9.76 - 21.02	13.64 \pm 1.59	13.42 \pm 1.53 ^a	13.53 \pm 1.56
2. MTF – Midpoint on the mandible symphysis	22.46 - 33.83	27.26 \pm 2.03	27.60 \pm 2.18 ^a	27.43 \pm 2.11
3. MTF – Posterior border of the ramus	60.73 - 81.56	71.35 \pm 4.26	70.87 \pm 3.97 ^a	71.11 \pm 4.12
4. MTF – Condylod process	75.14 - 109.28	95.43 \pm 4.82	94.72 \pm 4.88 ^a	95.08 \pm 4.86
5. Alveolar crest – Inferior rim of the mandible	20.11 - 43.53	28.98 \pm 2.75	29.65 \pm 8.92	29.31 \pm 6.60
6. MTF width (Horizontal dimensions)	1.85 - 13.91	3.64 \pm 1.08	3.77 \pm 0.68	3.70 \pm 0.91
7. MTF width (Vertical dimensions)	1.73 - 5.65	2.94 \pm 0.57	2.98 \pm 0.58	2.96 \pm 0.57

a $p < 0.05$ vs. right side

(In detail, see Appendix B)

MTF = Mental foramen

Table 3. Accessory mental foramen measurements

The Distance (n=7)	Range (mm)	Mean ± SD (mm)
1. AMT– Inferior rim of the mandible	10.69 - 20.18	13.99 ± 3.75
2. AMT – Mandible symphysis	22.58 - 39.27	31.58 ± 5.25
3. AMT – Posterior border of the ramus	67.43 - 78.36	72.75 ± 2.99
4. AMT – Condylod process	94.24 - 99.86	96.68 ± 2.36
5. Alveolar crest – Inferior rim of the mandible	28.25 - 30.58	29.68 ± 0.97
6. AMT width (Horizontal dimensions)	2.06 - 3.15	2.59 ± 0.39
7. AMT width (Vertical dimensions)	1.76 - 3.44	2.24 ± 0.58
8. The distance between 2 foramina	3.99 - 8.46	5.81 ± 1.71

(In detail, see Appendix B)

AMT = Accessory mental foramen

Table 4. Side distribution and the frequency of position of the mental foramen

Position	Right (Number)	Left (Number)	Total (Number)	Percent (%)
1. Below the first premolar	0	0	0	0
2. Between the premolars	7	5	12	3.33
3. Below the second premolar	124	128	252	70
4. Between the second premolar and first molar	45	42	87	24.16
5. Below the mesial root of the first molar	4	5	9	2.5
Total	180	180	360	100

Table 5. The frequency of the mental foramen found at the same position of both sides.

Position	Total (Number)
1. Below the first premolar	0
2. Between the premolars	4
3. Below the second premolar	113
4. Between the second premolar and first molar	30
5. Below the mesial root of the first molar	3
Total	150

3. Mandibular dimensions measurements

Data concerning the mandibular dimensions were summarized in Table 6. Results of this study showed the total length of the ramus was 63.53 ± 5.48 mm. Width of the mandibular notch was 33.50 ± 3.27 mm. Depth of the mandibular notch was 14.78 ± 1.93 mm. There were differences between sides.

On the other hand, the total length of the mandible was 122.63 ± 6.29 mm. The height of the ramus was 50.70 ± 4.35 mm. The distance of intercondyloid was 100.08 ± 5.96 mm. The distance of intercoronoid was 93.87 ± 5.69 mm. The menton – gonian distance was 81.93 ± 6.53 mm. The minimal width of the mandibular ramus was 34.79 ± 3.18 mm. The mandibular angle was 119.7 ± 4.64 degree. The height of the mandibular body was 26.89 ± 2.27 mm, which were not significantly different between sides.

Table 6. Mandibular dimension measurements

The Distance (n=180)	Range (mm)	Right Mean ± SD (mm)	Left Mean ± SD (mm)	Total Mean ± SD (mm)
1. The total length of the mandible	85.30 - 137.35	122.61 ± 6.28	122.65 ± 6.31	122.63 ± 6.29
2. The total length of the ramus	50.60 - 80.36	63.73 ± 5.47	63.33 ± 5.55 ^a	63.53 ± 5.48
3. The height of the ramus	39.10 - 62.44	50.64 ± 4.42	50.76 ± 4.29	50.70 ± 4.35
4. Intercondyloid distance	68.40 - 118.36	100.08 ± 5.96		
5. Intercoronoid distance	79.74 - 112.28	93.87 ± 5.69		
6. Menton – Gonian distance	53.40 - 95.60	81.85 ± 6.45	82.01 ± 6.64	81.93 ± 6.53
7. Width of the mandibular notch	23.11 - 42.48	33.76 ± 3.24	33.25 ± 3.29 ^a	33.50 ± 3.27
8. Depth of the mandibular notch	9.93 - 21.84	14.92 ± 1.98	14.64 ± 1.87 ^a	14.78 ± 1.93
9. Minimal width of the mandibular ramus	26.24 - 58.00	34.73 ± 3.08	34.84 ± 3.28	34.79 ± 3.18
10. Mandibular angle	105 - 132	119.6 ^o ± 4.65	119.8 ^o ± 4.64	119.7 ^o ± 4.64
11. Intergonial distance	74.65 - 110.03	94 ± 6.78		
12. Height of the mandibular body	19.74 - 35.82	26.84 ± 2.24	26.94 ± 2.31	26.89 ± 2.27

a $p < 0.05$ vs. right side

(In detail, see Appendix B)

- The total length of the mandible = Gnathion – Condylod process
- The total length of the ramus = Condylod process – Angle of the mandible
- The height of the ramus = Mandibular notch – Pre angular notch
- Menton – Gonian distance = Gnathion – Angle of the mandible
- Width of the mandibular notch = Condylod process – Coronoid process
- Depth of the mandibular notch = The vertical distance from mandibular notch to the line connecting the condylod process and the coronoid process.
- Height of the mandibular body = The height of mandibular foramen was measured at mid – The distance between menton and gonion

4. The frequency and anatomical features of torus mandibularis

The torus mandibularis as found in 18 mandibles (10%). The anatomical features of torus mandibularis were present in Table 7.

Table 7. Characteristics of the torus mandibularis

Characteristics	frequencies
Shape	
- Round	11
- Elongated	7
Torus type	
- Solitary	1
- Multiple	17
Location	
- Bilateral	17
- Right	0
- Left	1